

3.6.2 Physical Configuration Audits (PCA)

This procedure describes the mandatory requirements and supplemental guidance for performing PCAs. It includes organizational roles and responsibilities.

A PCA cannot be completed and a product baseline established without successful completion of a Functional Configuration Audit (FCA). This does not mean that a PCA cannot be conducted concurrently with an FCA.

3.6.2.1 Purpose

The procedure for performing a PCA is described below. The PCA is used to verify that a product is consistent with its design documentation. It is accomplished as part of the process that verifies that a product's requirements have been met and that the product design meeting those requirements has been accurately documented before a product configuration is baselined.

3.6.2.2 Scope

This procedure applies to IPTs, regional offices, and other solution providers at the point when they begin activities to establish the product baseline and formally process changes to the baseline configuration.

3.6.2.3 Responsibilities

- IPTs, regional offices, and other solution providers are responsible for overall PCA coordination and guidance in the audit planning, conduct, recording, approval and follow-up activities. They ensure that configuration audits are included in the contractual requirements and allocate sufficient resources for this activity. If the audit is conducted at an FAA facility, the IPT/region/solution provider organization provides resources, clearances, and appropriate technical support for the audit.
- The Quality Assurance group assigns a Quality Reliability Officer (QRO) to the system acquisition. The QRO provides inspection and other quality records containing dates, times, and places of all inspections, demonstrations, and tests with an indication of whether the QRO witnessed these activities. The QRO also provides information of all known unique manufacturing processes, special tooling, and special test/inspection equipment. The QRO monitors the status of any uncovered deficiencies and also deficiency corrections.
- For systems/subsystems that are installed and/or accepted at the Technical Center or a specified FAA site, local representatives provide technical expertise to the audit in terms of operation and installation.
- NAS Configuration Management and Evaluation Staff (ACM) reviews documentation as requested by the IPT/PT, and may assist in the planning

- and conduct of the PCA. Depending on audit requirements, ACM may supply a representative to the audit team.
- The IPT, regional office or other solution provider develops an audit plan if none is contractually required. The plan is then coordinated with the contractor and audit team members for concurrence.

3.6.2.4 References

Reference	Reference Para./Activity #:
<ul style="list-style-type: none"> • FAA Order 1800.66, Appendix 1, <i>Configuration Management in the National Airspace System</i>, Part One – Configuration Management (CM) Policy Elements 	<ul style="list-style-type: none"> • Statement I-4.5
<ul style="list-style-type: none"> • FAA Order 1800.66, Appendix 1, <i>Configuration Management in the National Airspace System</i>, Part Two – Configuration Management Handbook, Section II, National Configuration Management Process 	<ul style="list-style-type: none"> • 8 Initiate Acquire and Build Activities • 18 Establish/Update Facility Baseline • 23 Conduct Physical Configuration Audit (PCA) • 45 Develop/Implement Corrective Action Plans • 101 Perform Configuration Status Accounting

3.6.2.5 Procedure

The PCA ensures that all of a system's configuration items are identified consistently within a hierarchical framework and that all configuration items are correctly represented by appropriate documentation, i.e. drawings, specifications. It verifies physical items through a detailed review of actual subassemblies, assemblies and individual components, drawings, technical manuals and manufacturing assembly sheets. It verifies software by ensuring that the source code representation of each CI carries the identification contained in the index and that the index is complete and accurate. Verification of software comprises source code, object code, and the media carrying the code.

For steps describing audit planning, refer to the Functional Configuration Audit procedure in Section 3.6.1. (Planning for the two audits occurs at the same time and is normally documented in a single plan or section of a Configuration Management Plan.)

The IPT/region/solution provider organization shall assemble the audit team, ensuring that selected members are available for the scheduled audit. The FAA role on this audit team is of greater significance than that for the FCA, particularly

when compared to the contractor's role. The team members agree upon an audit agenda and the tasks to be performed.

Whether the audit is to take place at an FAA facility or a contractor facility, the IPT/region/solution provider organization shall ensure that the appropriate facility resources (including conference room space for the audit team) are available. Resources shall include access to the actual equipment (for hardware) and hands-on contact with listings, specifications, and the media carrying the software code. Often a manufacturer's technician is required to assist in the disassembly and reassembly of system components. PCAs are generally held at contractor facilities; however, the requirements of a particular project may dictate that the audit is best held at an operational facility, the Technical Center, the Aeronautical Center, or a key site.

After the audit team and the facility have been prepared, the IPT/region/solution provider organization shall conduct the audit. The audit shall ensure that the following criteria have been met:

- All system's CIs and their corresponding as-built documentation are identified consistently and uniquely within the documentation
- Each system CI conforms to its product specification documentation
- The contractor's change process and database of change activity is transferable and adaptable for FAA use and maintenance.

The audit team shall verify that the configuration index/family tree diagram specifies the hierarchical relationship of all system CIs, that all CIs are identified in relation to the system, and that there is a product specification for each CI. The audit team uses all available drawings as part of the verification process. (NOTE: for commercially available items, drawings may not be available.)

For Hardware Configuration Items (HWCIs), the audit team shall examine name plates and verify manuals and available drawings. Available drawings are sampled to verify conformance to standards specified by the contract. The audit team shall also ensure that the manufacturers or integrators hardware release process provides decomposition of any part, at any level, in terms of subordinate part numbers and next higher assembly of any specified part number.

For Computer Software Configuration Items (CSCIs), the audit team shall examine the different representations (source code, object code, listing, specifications, and related representations). The audit team shall verify that source listings comply with invoked editing standards (or industry standards, if no editing standards have been specified) and that CSCI design history is documented in Software Development Folders (or equivalent documentation). In addition, the audit team shall verify that a list of error conditions and messages exists, that software versions are appropriately identified, and that the software change control process has adequate security to guard against unauthorized changes.

The audit team shall examine the change process, verifying that the contractor's change control system is sufficient to control processing and formal release of changes. For software changes, the audit team shall examine the contractor's change management tools and databases. If these tools or databases are not transferred to the FAA, the audit team should check for potential problems in maintaining configuration control over CIs.

When the audit is completed, the audit team shall prepare a report of audit results. This report shall indicate whether the audit is approved without conditions, approved with contingencies, or disapproved. The report shall catalog any uncovered deficiencies and provides conclusions and recommendations. The report shall also include PCA minutes that are co-signed on a daily basis by the IPT/region/solution provider organization and the contractor.

If the audit is approved without conditions, the organization shall notify the contractor of the approval. If the audit is approved with contingencies, the corrective actions shall be performed. Corrective actions are generally assigned to the contractor, although in some cases the procuring activity may undertake corrective actions as well. After the corrective actions are completed, the QRO and other appointed representatives shall validate that they have been fulfilled. The organization shall then notifies the contractor of certification

Identification of major discrepancies, such as use of unreleased drawings or unapproved parts, shall require that the audit be disapproved. In such cases a recovery plan is necessary. The IPT/region/solution provider organization, in conjunction with the contractor, shall develop a recovery plan for correcting the issues listed by the audit, using guidance from audit team members and experts from other disciplines as needed. The recovery plan includes a schedule for conducting another audit. After the plan has been approved and steps to perform the recovery have been carried out, the organization and the contractor begin this procedure again (without the planning steps, which have already been fulfilled) to perform the audit.

Procedural steps follow. Figure 3.6.2.5-1 is a graphical representation of these steps.

Procedure Step	Procedure Description
1. Functional Configuration Audit (Procedure 3.6.1)	<ul style="list-style-type: none">The IPT/region/solution provider organization shall perform Procedure 3.6.1 to conduct a Functional Configuration Audit. Successful completion of the FCA is a pre-requisite to completion of the Physical Configuration Audit. Although, FCAs and PCAs may be conducted concurrently.

Procedure Step	Procedure Description
2. Schedule Audit	<ul style="list-style-type: none"> • The organization, in accordance with the audit plan and in conjunction with the contractor, shall schedule the audit. • Scheduling may be modified from that given originally in the audit plan depending on such factors as whether the testing at the CI level has been completed on time, whether the facilities are available or whether the audit team members are available, etc.
3. Provide Audit Material	<ul style="list-style-type: none"> • The IPT/region/solution provider shall ensure contractor documentation required for the audit is available.
4. Assemble Audit Team	<ul style="list-style-type: none"> • The organization shall assemble the audit team to conduct the audit.
5. Audit at FAA Facility?	<ul style="list-style-type: none"> • If the audit is conducted at an FAA facility, continue with Step 6. Otherwise proceed to Step 7.
6. Prepare FAA Facility	<ul style="list-style-type: none"> • The organization shall ensure appropriate resources are available for the audit including conference room space for the audit team. Proceed to Step 8.
7. Prepare Contractor Facility	<ul style="list-style-type: none"> • The IPT/region/solution provider shall provide appropriate contractor resources are available for the audit including conference room space for the audit team.
8. Conduct Audit	<ul style="list-style-type: none"> • The organization shall conduct the audit in accordance with the audit plan.
9. Record Audit Results	<ul style="list-style-type: none"> • The organization shall record results of the PCA. The report contains an approval/disapproval rating. • For an approval with contingencies, the report shall list the corrective actions to be performed, a schedule to perform them, and a plan to validate them.
10. Audit Approved Without Conditions?	<ul style="list-style-type: none"> • If the audit is unconditionally approved, continue with Step 11. If the audit receives contingent approval or is disapproved, proceed to Step 12.
11. Provide Audit Certification	<ul style="list-style-type: none"> • The organization shall notify the contractor of FAA approval via certification.

Procedure Step	Procedure Description
12. Audit Approved?	<ul style="list-style-type: none">• If the audit receives contingent approval, continue with Step 13. Otherwise proceed to Step 16.
13. Perform Correction Actions	<ul style="list-style-type: none">• The IPT/region/solution provider shall ensure the contractor performs the corrective actions to fix each uncovered deficiency.
14. Validate Corrective Actions	<ul style="list-style-type: none">• The QRO and other representatives appointed by the IPT/region/solution provider organization shall determine whether the corrective actions are satisfied.
15. Corrective Actions Fulfilled?	<ul style="list-style-type: none">• If the corrective actions were satisfactorily completed, proceed to Step 10. Otherwise proceed to Step 13.
16. Develop Recovery Strategy	<ul style="list-style-type: none">• For disapproved audits, the organization, in conjunction with the contractor, shall develop a recovery strategy.• The strategy shall include a schedule to fix deficiencies and a plan for a new audit.• After the recovery strategy is approved, the process for recovery may involve considerable effort. When the organization and the contractor reach concurrence that major deficiencies are corrected, continue with Step 2.

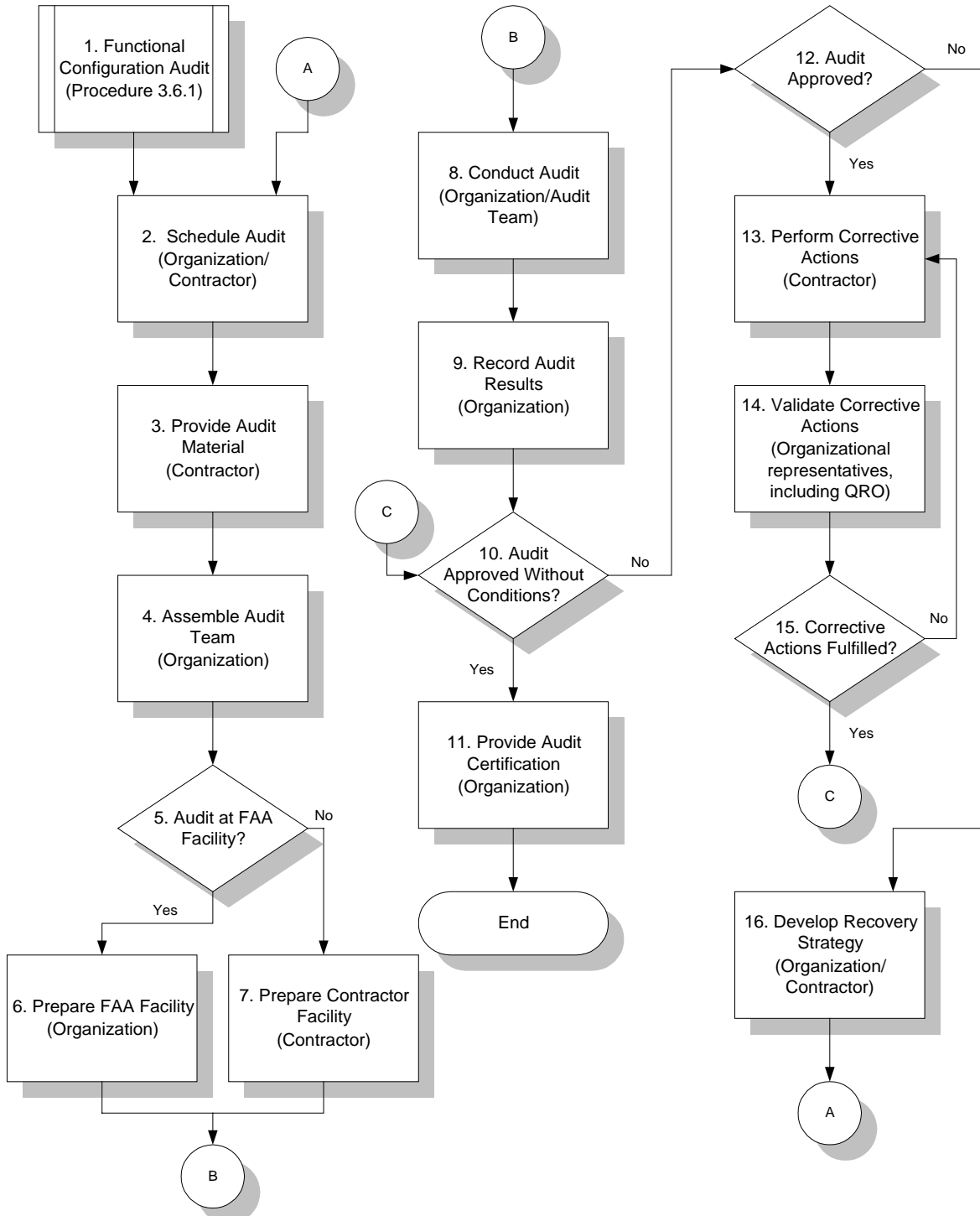


Figure 3.6.2.5-1. Physical Configuration Audits